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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,937	09/27/2006	Nobuto Terada	WAKAB98.001APC	8123
29995 7590 09/22/2008 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614				
EXAMINER				
MC CULLEY, MEGAN CASSANDRA				
ART UNIT		PAPER NUMBER		
1796				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/597,937

Applicant(s)

TERADA ET AL.

Examiner

Megan McCulley

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-10 and 12-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10 and 12-15 is/are rejected.
- 7) ☒ Claim(s) 1-6, 8-10 and 12-15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claims 1-6, 8-10 and 12-15 are objected to because of the following informalities: there is a typographical error in line 8 of claim 1. "Ration" should be "ratio". There is also a typographical error in line 23 of page 3 of claim 1. "The amount" should be "the amount". There are typographical errors in claim 8. The chemical "γ-glicidoxypopy-trimethoxy silane" should read "γ-glycidoxypopyl-trimethoxy silane" and the chemical "γ-glicidoxypopyl-methylidethoxy silane" should read "γ-glycidoxypopyl-methyldiethoxy silane". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6, 8-10, and 12-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear if the component (d) additive components should be plural or singular. In line 5 of page 4 of claim 1, the claim states "an adherence imparting agent is added as the additive component". This implies that there is only one additive component claimed, but on the first page of claim 1, the component is plural. If the component is meant to be plural, the claim is essentially changed from a "consisting of" claim to a "comprising" claim, since any additional component could fall within the

category of additive components when the claim is interpreted with the broadest reasonable interpretation. For the purpose of further examination, it is taken to mean there is only one additive component and it is an adherence imparting agent in order for the claim to read "consisting of". A suggested correction would be to change component (d) to "an adherence imparting agent that acts as an additive component".

In lines 5 and 6 of page 3 of claim 1, it is unclear what is meant by "in which mixture the ratio....in the ratio of the number of molecules". It is unknown how to have a ratio in a ratio. It is suggested that one of the ratio statements is deleted. For the purpose of further examination, it is taken to mean the ratio of the bifunctional epoxy compound to the trifunctional epoxy compound is selected to be within the range between 100:0 and 70:30.

In claim 2, the fourth line, it is unclear what a metal surface forming junction is. For the purpose of further examination, it is taken to mean it improves the adherence between the resin and a metal surface.

Claim 15 contains two trademarks. This renders claim unclear since the trademark is used to identify a source of the goods and not the goods themselves. See MPEP 2173.05(u). The source of the claimed anhydrides does not change the structure or function of the conductive adhesive.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3, 6, 9, 10, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo et al. (JP 07-090238) in view of Date et al. (JP 10-030082) in further view of Yamaguchi et al. (US 2002/0061971). The English machine translations of the Japanese documents are used for the citations below.

Regarding claims 1, 3, 6, 9, 15: Okubo et al. teaches a conductive adhesive/bonding material (abstract) consisting of a conductive medium/silver powder (abstract) and a binder resin/epoxy (abstract). The amount of silver powder to the epoxy is 60% -85%. While this does not overlap the claimed range, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05 I. In this case a person having ordinary skill in the art would recognize that 55% silver powder and 60% silver powder would be expected to have the substantially the same properties in the composition.

Since pure silver powder is used, 100% of the metal powder is silver powder.

The binder resin consists of an epoxy resin which can be 1,6-dihydroxynaphthalene diglycidyl ether (para. 6 and 10), a curing/hardening agent (para. 6), an optional curing/hardening accelerator (para. 12), an optional adherence imparting agent/coupling agent (para. 12), and an optional diluting solvent/diluent (para. 11). At the time of the invention a person having ordinary skill in the art would have found it

obvious to add the optional hardening accelerator and would have been motivated to do so for such desirable properties as to accelerate the curing speed of the curing. At the time of the invention a person having ordinary skill in the art would have found it obvious to add the optional coupling agent and would have been motivated to do so for such desirable properties as increased adherence between the metal and resin. At the time of the invention a person having ordinary skill in the art would have found it obvious to add the optional diluent and would have been motivated to do so to control the viscosity of the composition, which is a concern of Okubo et al.

Okubo et al. teaches a mixture of two or more multifunctional epoxy resins (para. 11). The disclosed 1,6-dihydroxynaphthalene diglycidyl ether and bisphenol A diglycidyl ether, which are used in the examples, are both bifunctional epoxy compounds so the ratio of bifunctional to trifunctional is 100:0.

The 1,6-dihydroxynaphthalene diglycidyl ether has a polycyclic aromatic ring skeleton and the bisphenol A epoxy resin has a ring structure other than a polycyclic aromatic ring. The ratio of the polycyclic aromatic ring epoxy to other than polycyclic aromatic ring epoxy is not disclosed. However, Date et al. discloses 100 parts of a naphthalene epoxy resin and 50 parts of a bisphenol A epoxy resin. Okubo et al. and Date et al. are analogous art because they are both concerned with the same field of endeavor, conductive adhesives used for joining printed circuit boards. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the amount of naphthalene epoxy to bisphenol A epoxy and would have been

motivated to do so for such desirable properties as improved heat resistance, high glass transition temperature and low heat shrinkage, as evidenced by Date et al. (para 19).

The 1,6-dihydroxynaphthalene diglycidyl ether is a multifunctional epoxy compound having a bicyclic aromatic condensed ring skeleton.

Okubo et al. does not teach an acid anhydride curing agent. However, Yamaguchi et al. teaches a similar epoxy composition cured with acid anhydride curing agent Epicure YH306 (para. 41) in a ratio of 0.878 anhydride equivalents to epoxy equivalents (example 2), which falls within the claimed range. Okubo et al. and Yamaguchi et al. are analogous art because they are both concerned with the same field of endeavor, namely epoxy resins for semiconductor units. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the acid anhydride of Yamaguchi et al. with the composition of Okubo et al. and would have been motivated to do so for such desirable properties as a reduced modulus, as evidenced by Yamaguchi et al. (table 1 and para. 66). This acid anhydride has a cyclic acid anhydride moiety and another hydrocarbon ring fused to it in which 3 chain hydrocarbon groups are substituted onto the ring and the number of carbon atoms composing the hydrocarbon ring is 12.

The diluting solvent/diluent disclosed, cresyl glycidyl ether, has a high boiling point, namely 109-111 C.

Regarding claim 10: Okubo et al. teaches the case that the metal powder is pure silver and not mixed with another metal powder.

Regarding claim 12: Okubo et al. teaches the other epoxy resin can be bisphenol A diglycidyl ether, which is used in the examples.

Claims 2, 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo et al. (JP 07-090238) in view of Date et al. (JP 10-030082) in further view of Yamaguchi et al. (US 2002/0061971) as applied to claim 1 above and in further view of Giroux et al. (US 2002/0117259). The English machine translations of the Japanese documents are used for the citations below.

Regarding claims 2, 8, and 13: Okubo et al. teaches the basic claimed composition as set forth above. Okubo et al. does not teach a silane coupling agent, specifically γ -glycidoxypentyl-trimethoxy silane or γ -glycidoxypentyl-methyldiethoxy silane. However, Giroux et al. discloses a similar composition comprising an epoxy resin (abstract), electrically conductive silver filler (para. 48) and glycidoxypentyl trimethoxy silane (para. 58). Okubo et al. and Giroux et al. are analogous art because they are both concerned with the same field of endeavor, namely conductive epoxy adhesives. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the glycidoxypentyl trimethoxy silane of Giroux et al. with the composition of Okubo et al. and would have been motivated to do so for such desirable properties as bonding inorganic materials such as metal fillers to organic resins.

Allowable Subject Matter

Claims 4, 5, 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

In regard to claims 4 and 14, Okubo et al. is the closest prior art. Okubo et al. does not teach the ratio of the dihydroxynaphthalene epoxy to the other epoxy components is a 3:1 weight ratio. Examples 2, 4 and 5 in table 1 use both dihydroxynaphthalene epoxy and another epoxy, namely bisphenol A epoxy. The weight ratio for example 2 is 1.66:1, for example 4 is 1.1:1, and example 5 is 1:1. Also, there is no teaching that a person having ordinary skill in the art would want to increase the ratio to 3:1.

In regard to claim 5, Okubo et al. is the closest prior art. In example 7, 2-methyl-4-ethylimidazole is used in an amount of 1 weight part. Assuming 1 weight part is 1 gram, this is 0.009 moles. Based on the epoxy equivalent weight of 1,6-dihydroxynaphthalene epoxy (141, para. 13), there are 0.099 equivalents of epoxy. Therefore, the ratio of moles of imidazole to epoxy equivalent is 0.09:1, which is outside of the claimed range. There is also no motivation to lower this ratio.

Response to Arguments

Applicant's arguments with respect to claims 1-6, 8-10 and 12-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megan McCulley whose telephone number is (571)270-3292. The examiner can normally be reached on Monday - Friday 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo, Ph.D./
Supervisory Patent Examiner, Art Unit 1796
15-Sep-08

/M. M./
Examiner, Art Unit 1796